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THE LATE MR. G. L. Y. INGRAM, M.R.C.V.S.

By the death of Mr. Ingram the veterinary profession has lost a man of brilliant promise, one whose career had commenced so well that his future seemed assured. Workers in the domain of veterinary pathology and bacteriology are all too few, especially in Great Britain, and the loss even of one of them cannot but be felt and much deplored. After qualifying in 1909 at the London College he occupied the post of House Surgeon, and then obtained the position of Veterinary Surgeon to the Brown Institution. Here came his opportunity and he did not fail to seize it, doing a considerable amount of original research work in the laboratory in collaboration with Dr. Twort, the Superintendent. Together they worked at several diseases of animals, including tuberculosis and Johne's disease, and it was in connection with the latter that his name will always be handed down in the world of science. Various attempts had been made to cultivate the specific organism, but all the results were negative until 1910, when Twort and Ingram succeeded in growing it outside the animal body on a special medium, and the interest awakened in this disease culminated in a text-book embodying all the latest details, symptoms, treatment, &c., of value to the clinician. For this alone the veterinary practitioner owes him a debt of gratitude, for few men have, in so short a space of working years (he was only 30) done more. If by his earnestness his example may have instilled fresh ideas and hopes into others his all too brief career will not have been in vain.

Editorial.

THE MATRICULATION EXAMINATION.

THE question as to whether the matriculation standard shall or shall not be kept exactly the same as for students of human medicine is one about which there should be no argument. The veterinary profession is strong enough to stand by itself, if necessary, in regard to many things, and it has been wise of late years in not slavishly copying its more powerful fellow-worker; but whether it is wise for us to adopt a standard of preliminary education which allows a student who could not enter the sister profession to come and enter ours is quite another matter.

Let all commence on exactly the same foundation, so that what is good enough for human medicine is good enough for us, but do not let us be retrograde in this respect. Such a step will not help to any appreciable extent to fill our colleges with students, but in any case the preliminary weeding out is just as necessary for us as for them, and the work which the veterinary practitioner undertakes requires just as much brain and knowledge as that of his human *confrère*. It is usually necessary that with his many disadvantages, he should be more resourceful, and no one better than a teacher or practitioner of the past decade can appreciate the improvement which the adoption of the higher matriculation examination, "the same as for the medical," has made upon the veterinary practitioner of to-day; and this, not only for himself but judged by the respect accorded by the public, who, after all, are by no means slow in giving their judgment.

If the leaders of the medical profession deem it wise to delete certain lower standard matriculation examinations we shall by no means be doing wrong in copying their example; for our men, like theirs, need the best of brains, and the higher the standard of education at the commencement, the better the foundation upon which to build.

General Articles.

SLEEPING SICKNESS, TSETSE, AND BIG GAME.

By GEORGE PRENTICE, L.R.C.P. & S., D.T.M.
Kasungu, Ugara, Nyasaland.

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I HAVE read with much interest the articles and correspondence in the issues of the *British Medical Journal* for June 21 and July 19, 1913, regarding tsetse, big game, and sleeping sickness in Nyasaland and Rhodesia.

With the exception of three furloughs spent in Britain I have been at work in the territories referred to since 1894. For many years after my arrival on Lake Nyasa my practice extended over a very wide area, and it so happened that many of my journeys were made through districts which are now infested with tsetse-fly. It has been my custom to use riding animals whenever it was possible to do so. Frequently I had opportunities of shooting game as we travelled. In the early days I frequently had dogs with me. The presence of riding animals and good dogs made me very careful about the possibility of encountering tsetse-fly when on tour, and a close observation was made when game was shot as to whether or not tsetse happened to be about. Time and again I travelled through districts where in pre-rinderpest days Arab caravans used to travel by night in order to avoid their animals being bitten by tsetse. Yet in those early years—1894, 1895, 1896—both Nyasaland and Rhodesia were remarkably free from that fly. The explanation given me by many headmen and others was that since rinderpest had killed off most of the big game tsetse-fly had disappeared. I can speak from personal experience and observation of many hundreds of miles of territory where in those early days not a single tsetse-fly was to be encountered, and where to-day it swarms, and not a single domestic animal can live. I have watched the spread of tsetse-fly for many years now, and long ago warned the Government of the risks they were incurring in allowing it to spread. I appealed to the authorities in Nyasaland and Rhodesia to arrest the spread of tsetse, both on the grounds that *Glossina morsitans*

was killing off domestic animals and that it might yet prove to be a carrier of a trypanosome pathogenic to man.

Those of us who are working on the spot attribute the enormous increase of tsetse-fly during recent years entirely to the great increase of big game. The increase of game we attribute entirely to the protective measures employed by the Government. About these we need not write in detail meantime. The laws were passed with a view to protecting the wild fauna of this part of Africa, and they have succeeded, I should think, beyond the wildest dreams of those who were responsible for bringing them into being. The wild animals have been preserved, but domestic animals have been sacrificed, and now we are paying a heavy penalty in human lives for having interfered with the balance of Nature.

In a district in which the natives owned 200 head of cattle an incursion of tsetse took place following upon the herds of buffalo that came into it. Within two years the natives owned only 80 head. Under normal circumstances there should have been an increase of 50 per cent. per annum—300 head in all, instead of 80.

In another district known to me where the people were rich in sheep, goats, and cattle, a recent investigation revealed the presence of only four dogs, and these recently imported. Besides having lost their stock, the people are now being killed off by *G. morsitans*. Yet with all this going on the people are not allowed to act in self-defence. Game laws which would turn any Government out of power if imposed at home are forced upon a primitive people here who have no means of redress.

To those of us who take an interest in politics, it is not a little amusing to find the Chancellor of the Exchequer posing in the matter of game as the friend of the down-trodden peasant at home, whereas a member of the same Government, in the person of the Colonial Secretary, carefully protects the huge animals that eat up the native's crops, kill off his cattle, and carry in their blood the disease germs of certain death to human beings, and that notwithstanding a promise we believe he made to a deputation representing all the missionary societies at work here—that on evidence being adduced that game was responsible he would not fail to act. His replies to Dr. Chapple in the House of Commons have already been referred to in THE VETERINARY JOURNAL. Not

only do elephants destroy the mealie crops, they this year (1913) fought the owners for possession of the gardens. In my hospital at Kasungu I had recently four patients at one time who had been mauled by wild animals. Three of them had been hurt by elephants in the gardens.

There is one aspect of this question to which I have sought to draw attention. The infant mortality in this country is appalling; so, too, is the mortality among adults from diseases of the alimentary tract. The native has no sick-room cookery worthy of the name. We have sought to teach him the value of milk as a diet for infants and during disease. But along comes tsetse, and this potential food supply in sickness is cut off. Thus indirectly by destroying the food supply and directly by carrying the deadly trypanosome does tsetse kill off the population. When we speak of the population being killed off we mean what we say. The disease, both in Rhodesia and Nyasaland, is much more serious than certain reports make it out to be. The first cases I had in my hospital here were from a district where sleeping sickness was not known to exist. Reports reached me of a very fatal disease having broken out among the natives, who spoke of it as a virulent form of measles. A lad in our employment entered the district and got badly bitten by tsetse. He became very ill, and was carried back to my hospital. I thought he had tick fever, and proceeded to examine his blood for spirochætes; I found trypanosomes. So far as my knowledge goes, that was the first case for which *G. morsitans* was held responsible by a medical man. The Government sent a medical officer into the district and other cases were found. The virulent form of "measles" had carried off many victims before the real nature of the disease was diagnosed. It has carried off many more since.

How do those of us who are working on the spot believe that the disease should be eradicated? For we do believe that the disease should never have existed here, and that it can, and ought to be, eradicated. We believe that for the time being a severe onslaught must be made upon the wild animals until these are driven back from human settlements and from the public highways. Until the present danger is past, all wild animals capable of acting as a reservoir of trypanosomes should be treated as vermin and destroyed or driven out just as rats are destroyed during an outbreak of plague. I, for one, would

welcome an outbreak of rinderpest such as swept this country in 1893 and 1894. It would leave us with a clean country, and, having learnt our lesson in a hard school, we should be slow to impose laws protecting game. We cannot cure the disease when once it has taken hold of human beings. Only those who have seen the victims can realize the horror and the hopelessness of it. We can starve out tsetse by depriving it of its supply of warm blood, and at the same time we can remove the natural reservoir of the disease by driving out or destroying the game. It has been asserted that tsetse can and does exist where it cannot possibly depend upon game for its sustenance, game being absent. This does not hold good of *G. morsitans* in Nyasaland and Rhodesia. Instances cited by the Colonial Secretary do not stand the test of investigation.

Again, we are told that if game is driven out tsetse may attack man and his domestic animals more vigorously than at present. In that case, when rinderpest killed off the game tsetse ought to have betaken itself to the nearest villages to feed upon the people. But it did not. It disappeared or remained only in small patches among the foothills, where small herds of game escaped the rinderpest. Similarly, in South Africa, when the Boers shot off the wild animals tsetse ought to have remained behind to feed upon man and his domestic stock. But it did not. There is ample proof that wherever game is killed off by disease, or hunted out, *G. morsitans* disappears. There is no proof to the contrary. I hold that the time for experimenting has passed, and that we ought at once to adopt such measures as may be necessary to save the people here from further risk and loss. Traders, farmers, planters, transport riders, and missionaries ask for permission to act in self-defence, permission to save their interests from ruin and themselves and their people from danger. If we make a mistake we suffer for it, and can blame no one but ourselves. But why should we be called upon to suffer for the fads and mistakes of people at home? We hold that further temporizing, in the light of our present knowledge, is nothing short of criminal folly.

With reference to Dr. Neave's suggestion that the game within a certain area should be impounded and destroyed, I may say that this suggestion was made fully two years ago. We asked, when the first epidemic broke out in Nyasaland, to have the game

destroyed. This was refused, on the grounds, among other reasons, that the outbreak was distinctly localized, and that any interference with the game might cause the animals to spread out and carry disease into clean districts. On the strength of this statement I suggested to the Acting Governor that he should impound all the animals within the area mentioned, and once and for all stamp out the disease by exterminating the animals. To this proposal I got a reply that, while His Excellency appreciated my good intentions, he did not regard the proposal as practicable.

In conclusion, I should like to express my appreciation of and gratitude for the work of the Liverpool Commission, which has settled once and for all many hitherto hotly disputed points, and also my gratitude to the *British Medical Journal* for the publicity it is giving to the work of Dr. Warrington Yorke.

VACCINE TREATMENT OF MASTITIS IN CATTLE.

By H. A. REID, F.R.C.V.S., F.R.S.E., D.V.H.

I was much interested in the remarks of Mr. Arthur Payne, F.R.C.V.S., which appeared in the issue of the Veterinary Journal for February last concerning vaccine treatment of mastitis in cattle. As I have had considerable experience of this form of treatment in streptococcal infection of the udder both in cows and goats it may not be out of place if I add a few remarks to those of Mr. Payne in regard to the results obtained by the application of vaccine therapy in this condition. I may state at once that the use of bacterial vaccines in the treatment of mastitis has not met with very great success in my hands, nor have my colleagues in the field, using vaccine prepared at this laboratory, met with much greater encouragement. The limitations of such treatment are appreciable only when one considers for a moment the pathology of the disease in question, and apparent successes may also be discounted unless one makes a point of verifying beforehand whether the mastitis is actually due to infection by streptococci, or whether it arises from other causes such, for instance, as overstocking, chill, traumatism, &c. In the latter case the condition would remain unaffected by the injection of streptococcic vaccines, and would generally yield to the older forms of treatment usually adopted.

During a course of experimental vaccinal treatment of mastitis in

1911 I was much struck by an article appearing in the *British Medical Journal* contributed by Dr. T. H. Benians, of the London Hospital Bacteriological Laboratory, and Assistant in the Inoculation Department of that Institution.* Dr. Benians has had considerable experience in the treatment by means of vaccines of acute mastitis in women, consequently the article is of much comparative interest and gives some valuable information respecting the pathology and treatment of this condition.

According to Benians the infective bacteria in the human subject are *Staphylococcus aureus* and *S. albus*, and less frequently streptococci. The organism may enter the breast from the blood-stream, but more often gains access either through cracks and fissures of the nipples contaminated by the pathogenic bacteria or through the milk ducts direct.

Where infection takes place through fissures of the nipple, the organisms are conveyed by the lymphatics, and set up suppuration commencing in the connective tissue of the gland. Where, on the other hand, infection proceeds by way of the milk ducts, the inflammation extends outwards from the gland ascini to the interstitial tissues. Benians distinguishes two types of mastitis, whose onset bears evidence of a different mode of infection. The minority of cases are of the nature of a diffuse cellulitis, characterized by a firm, uniform swelling, limited to one part of the gland, and frequently proceeding to suppuration. In these cases there is generally no obstruction to the milk flow in the earliest stages. The type of case most frequently met with, however, begins as a lobular mastitis, usually as a sequel to the sudden cessation of suckling. The milk becomes clotted in the distended breast, and there is some pain and rise of temperature. In these cases resolution is the rule, rarely does suppuration take place. Lesions of the nipple are seldom found to account for this condition. Staphylococci are nearly always found in the milk clot. The streptococcal form of mastitis met with in woman appears, according to Benians, to proceed from an infected nipple lesion ; it spreads by the lymphatics and involves the interglandular tissues without at first causing obstruction of the milk. The clinical features of such cases are parallel with what obtains in the more commonly encountered forms of bovine mastitis.

* T. H. C. Benians, M.R.C.S., &c. "The Use of Vaccines in Acute Mastitis," *British Medical Journal*, April 15, 1911.

In regard to treatment Benians found that when the invading organisms were lying in the lymphatic vessels and connective tissue of the gland, parts well flushed by the body fluids, vaccine treatment was successful and suppuration could be prevented by their judicial use. When, however, the milk has clotted in the ducts, permitting bacteria to multiply in the stagnant secretion, which, moreover, cannot be reached by the opsonin carrying body fluids, the results of vaccine treatment were not satisfactory. Dr. Benians points out that the anatomical conditions present in such cases are to a large extent opposed to the success of vaccine therapy. "The bacteria are multiplying inside the ducts and ascini, shut off from direct action of the body fluids by a well-marked basement membrane. They are, strictly speaking, outside the body altogether. . . . . looked at in this light it would be surprising if they (the vaccines) should succeed."

In human practice the suppurating gland is surgically opened so as to allow free drainage, and unless this is done the vaccine treatment is of no avail, "for it appears that where pus is pocketed the condition is only aggravated by the administration of vaccines."

I have drawn largely upon Dr. Benians' observations because they help to explain in a great measure the small success attending the use in our hands of vaccines in the treatment of mastitis in cows.

When it is realized that primary, acute cases in cattle are rarely brought under the notice of the veterinary practitioner, the unsatisfactory results following this method of treatment can readily be understood.

In goats experimentally infected better results have been obtained, but the open conditions under which these animals were kept nullified to a large extent the beneficial effect derived from the vaccine.

In this country two varieties of streptococcal mastitis have been observed. One of these is caused by a streptococcus which conforms culturally to *S. mastitidis* (Savage),* and another due to infection by *S. pyogenes.* The first named (*S. mastitidis*) produces acid reaction in three days when sown in media containing lactose or saccharose, but this reaction does not take place when it has been added to the culture medium, and not generally in salicin, raffinose, or inulin. It coagulates milk.

* Savage, "Bacterial Studies of Milk," "Local Government Board Report," 1906-07.

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S. pyogenes, on the other hand, produces acid in mannite and milk, but does not clot the latter.

It is probable that streptococci of other varieties may also be present occasionally in milk from certain cases of mastitis, but unfortunately a systematic examination into the cultural characters of streptococci in each case has not been undertaken.

Staphylococci are commonly met with in milk from healthy cows' udders, and may be regarded practically in the light of harmless saprophytes. In certain cases, however, I have observed severe mastitis in which only staphylococci could be observed and isolated from the udder secretion; in such cases the staphylococci resembled *S. albus.*

In the great majority of cases of mastitis due to streptococcic infection staphylococci are also found to be present. They develop upon agar in discrete, semi-translucent colonies, having a tendency to overgrow the finer, dew-like streptococcic culture. In order to ascertain whether staphylococci of this character were capable of setting up mastitis when introduced into the healthy udder, or, indeed, whether naturally occurring cases of mastitis might not be to some extent dependent upon the symbiotic relationship of staphylococci and streptococci, I proceeded to introduce a pure culture of these staphylococci into the udders of two goats by way of the teat duct. The inoculations succeeded in setting up a mastitis which led to notable changes in the milk secretion, consisting of catarrh of the epithelial cells of the ascini, accompanied by the presence of pus cells and immense numbers of the infective cocci. The inflammatory symptoms subsided about the fifth day following the inoculation, and within a week the subjects of the experiment had recovered, while the milk resumed its normal appearance. It seems possible that the presence of cocci in the gland may, under certain conditions, act, as it were, as an adjuvant in the production of streptococcic mastitis. The following instance may be cited as of interest in this connection: A healthy cow received 0·5 c.c. of broth culture of staphylococci derived from the milk of a healthy cow with clinically normal udder. Four days later symptoms of mastitis were manifested, with numerous staphylococci in the secretion. Eighteen days from the date of inoculation this cow showed typical symptoms of streptococcic mastitis due to presence of *S. mastitidis.* Needless to say every care had been taken to avoid accidental infection by this organism. This cow was inoculated with a dose of 500,000,000

streptococci (autogenous vaccine), and the same quantity of killed staphylococci isolated from "normal" milk were also injected at the same time, the case being viewed as a mixed infection.

On the following day slight improvement was evinced, there being less pain on manipulation of the udder, while the milk contained a notably less proportion of inflammatory products. Five days later a further similar dose of mixed vaccine was given, and improvement in the shape of lessened induration of the affected quarter was noted to take place within the next three days. The right fore-quarter was now found also to be affected, probably from accidental infection from the left. Streptococci were evident in the milk secretion from this quarter, which was slightly swollen and painful around the base of the teat.

One more injection of 500,000,000 mixed staphylococci and streptococci was made and clinical symptoms gradually subsided, but streptococci could be recovered from the milk after six weeks had elapsed, and the cow was still in an infective state. The animal was finally sold for slaughter.

The question of the apparent transmutability of streptococci is also of much interest, as the following instance will serve to illustrate :—Experimental cow (No. 8) received 2 c.c. pure culture of a streptococcus isolated from the udder of a healthy cow showing no symptoms of mastitis. The inoculation was made by means of a sterile canula passed up the teat duct into the milk sinus. Twenty-four hours later the inoculated quarter showed signs of inflammation, and the milk secretion became abnormal in appearance. Microscopic examination showed it to contain large numbers of epithelial cells and leucocytes, but no organisms could be demonstrated upon direct microscopic examination.

After incubation at 37° C. for twenty-four hours, streptococci could be discovered in this milk. These gave the cultural reactions of *S. mastitidis.* In four days following the primary inoculation the disease had assumed the appearance of a typical streptococcic mastitis. In thirteen days the streptococci had apparently disappeared from the secretion, but returned again seven days later on the advent of cold weather. After two months the cow was slaughtered. The udder presented the usual pathological picture of mastitis, with considerable induration of the affected quarter, while streptococci were present in the remote ascini of the gland. No curative treatment was attempted in this case. It serves to demonstrate the fact that an

apparently non-pathogenic streptococcus may assume, under certain conditions, virulent properties towards animals of the same species.

I do not propose within the limits of this contribution to cite a number of cases treated by bacterial vaccines, but as an instance of the unreliable nature of this form of treatment in bovine mastitis, the following is perhaps worthy of mention :—

Shorthorn cow, third calf, calved about four months, affected with mastitis in both hind quarters. The case had been allowed to proceed for nearly a fortnight before it was secured for vaccine treatment. The affected quarters were hard and rather painful to the touch, and the secretion from them was rich in purulent material; the case had reached a subacute stage. *S. pyogenes* was isolated from the secretion and a vaccine prepared accordingly. An initial dose of 500,000,000 was given and this was increased up to 1,000,000,000 in the course of nine days. Satisfactory results followed the primary injection, for in a week the milk from the affected quarters, which beforehand had been pustular in appearance, had returned to its normal condition so far as its microscopic appearance was concerned, although an excess of cellular constituents was visible on microscopic examination of the secretion. Shortly afterwards the right fore quarter was found to be affected, probably as a result of accidental infection from the back quarters. Inoculation with 1,000,000,000 dead streptococci was followed by marked amelioration in the condition all round, which lasted until the fourth day following. A relapse then occurred, the case appearing to be as bad as ever, the back quarters again sharing in the inflammatory condition. Further inoculations of vaccine did not appear to favourably influence the course of the disease. Notable oscillations in the condition of the udder and secretion during the period of treatment were seen to follow any marked climatic change, cold, and especially wet weather, exercising a decided retrogressive effect. This is so evident in all cases under vaccine treatment in the field that I consider it to be one of the weakest features of the method as applied to veterinary practice, particularly in this country where cattle are not housed, and where the provision of comfortable accommodation for a sick beast is often unobtainable.

I believe that vaccine treatment may in some measure retard the process of fibrosis or induration of an infected gland which causes the animal to become "blind" in the affected quarter, and constitutes one of the most serious aspects of the disease. In several

cases treated by vaccines, which have been kept under observation for periods up to five months, no noticeable induration had occurred, although streptococci were present throughout this period and the milk remained infective. This is quite exceptional, induration of one or more quarters followed by permanent loss of the secretory function being the rule in the majority of cases of streptococcic mastitis. Should the inoculation of vaccine exert this beneficent effect it will alone constitute a very favourable point in regard to this method of treatment, for it is well known that cows when they become "dry" recover from mastitis, and, provided induration of the affected quarter has not taken place, will come into profit next year free from disease, the reason for this being that the carbohydrate, in the form of milk sugar, upon which the streptococci seem to be highly dependent, has been lost, thus depriving the organism of a suitable medium in which to propagate.

It may be remarked that no reference has been made to the reaction as indicated by estimation of the opsonic index in relation to cases of mastitis treated by means of vaccine. When first I commenced this treatment I had no proper facilities for carrying out this procedure on a large enough scale to be of any value. Moreover, experience in certain cases treated by vaccines where estimation of the opsonic index has been attempted has led me to consider that under purely natural conditions—i.e., animals exercising in the open, exposed to any climatic conditions which may prevail, and entirely unsheltered—the opsonic index as a measure of phagocytic activity is quite unreliable. Further, it has been shown that a high index cannot be taken to indicate immunity or denote progress towards recovery, neither does a low index prove the converse. Conditions of rest, so important to ensure in the majority of bacterial infections under treatment with vaccines, are practically impossible to obtain under any circumstances in regard to animals. Careful clinical observation is of paramount importance. Too large or too frequently repeated doses of vaccine must be strictly avoided, and inoculation should never be repeated during periods of depression characterized by noticeable retrogressive symptoms in the case under treatment. Inoculations during adverse climatic conditions should likewise be avoided when possible.

Whatever form of treatment is resorted to, proper attention must be given to the local condition of the udder. The quarters should be thoroughly milked out, the milk cisterns being completely emptied of

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the contained clot, which forms such a suitable nidus for the propagation of the invading organisms. To effect this, it is necessary to gently but firmly squeeze the teat from above downwards, commencing at the base of the udder, and working down repeatedly, in order to break up and exude any clot which may have formed. This process should be gone through three times a day, and should always precede any form of treatment such as the injection of antiseptic solutions, which still find favour with some, although, in my experience, they are worthless for treating streptococcal infection of the udder. The injection of antiseptics into the udder, if carefully done with properly sterilized instruments, certainly possesses the advantage of hastening the "drying off" process, and thus indirectly aids in preventing the conveyance of the disease by infective material.

It would appear that some reliable method of treating contagious mastitis has yet to be evolved. I propose to try the effect of serum inoculation, which is claimed to give satisfactory results in the treatment of this disease in Holland. The serum is prepared by the repeated inoculation, in gradually increasing quantities, of living cultures of streptococci into the jugular vein of cattle. I have injected living cultures up to 350 c.c. in this manner without any untoward result, and I have now a large amount of this serum ready for future use. I fear that the limitations referred to above, in connection with vaccine therapy, will also prove an insuperable difficulty in regard to treatment by means of serum. Meantime mastitis constitutes one of the most serious menaces to the dairying industry throughout the world, and nothing should be left undone in an endeavour to find some effective method of treating this disease whenever it makes its appearance in a herd.

In conclusion, I may say that I have tried various methods for preparing vaccine. I have discarded sterilization by heat in regard to *S. mastitidis*, and now simply add to the bacterial emulsion 0·3 per cent. tricresol, which I find equally effective, and which has seemed to render somewhat better results than in the case of vaccine sterilized by heat. I have not yet had the opportunity to see the work on "Vaccine Therapy" written by Mr. W. M. Scott, F.R.C.V.S., but I look forward to its perusal, and I agree with Mr. Payne in his remarks concerning the necessity for a work of reference for the use of veterinarians on this important subject.

THE CURATIVE TREATMENT OF HÆMORRHAGIC SEPTICÆMIA IN CATTLE BY THE ADMINSTRATION OF IODINE.*

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During the past two years a large number of experiments have been carried out from time to time to test the influence of antiseptics and other drugs on the course of the disease in rinderpest and hæmorrhagic septicæmia.

The following are the principal drugs whose action was investigated :—

Acids.—Lactic, oxalic, hydrochloric, boric, salicylic, nitric, sulphuric and hydrocyanic.

Antiseptics.—Carbolic acid, iodine, iodoform, mercury perchloride, chinosol, cyllin, quinine, potassium permanganate, mustard oil, hydrogen peroxide, turpentine, guaiacol and thymol.

Other Drugs.—Ipecacuanha, emetine, arsenic, sulphate of magnesium, glycerine, opium, cannabis indica, nitrate of silver and aniline dyes.

Administration was made by the mouth, and, when suitable, by subcutaneous and intravenous injections. Small and large doses, single and repeated, were tried.

As a first experiment, the drug was given simultaneously with the inoculation of the virus, in order to observe if the incubative period was prolonged or the course of the disease in any way modified.

In other tests the treatment was given after the period of incubation, at the first appearance of symptoms, in order to study any curative effect which the drug might possess.

In some cases the disease was well established before treatment was commenced. The severe symptoms were treated and observation made as to how far this assistance prolonged the life of the animal.

Hæmorrhagic Septicæmia.

In cattle the disease experimentally inoculated runs a very much more rapid course than when natural infection occurs. Following the subcutaneous inoculation of 0·1 c.c. of a forty-eight hours' broth culture, the temperature rises two to three degrees in from twelve to

* An abstract of a report from the "Memoirs of the Department of Agriculture in India."

eighteen hours and the animal usually dies in from twenty-four to thirty-six hours. The mortality is very great, especially among young buffaloes. About 90 per cent. of these animals succumb to the inoculated disease.

In the naturally contracted infection the disease runs a less acute course and a greater percentage of animals recover. In a very large number of inoculations, carried out in this laboratory during the past six years, no case has been observed which has recovered after displaying a decided rise of temperature or other symptoms unless he had received anti-serum treatment.

In from eighteen to twenty-four hours after inoculation the organism can be detected by inoculation and cultural methods in the peripheral blood and also in the urine.

It can well be understood that drug treatment of so rapidly invading and fatal a form of the disease held out little hope of success.

Few of the drugs tested for inhibitive or curative power showed any influence on the course of the disease, and details of all the experiments with negative results would serve little purpose. There are, however, two methods of treatment which I propose to describe in detail : first, that with permanganate of potash ; and second, the administration of iodine.

Treatment with Permanganate of Potash.

The treatment with permanganate of potash is of interest, as recently Walker in the Punjab has recorded successful results following the administration of this drug in hæmorrhagic septicæmia and rinderpest.

He gives details of twenty-three cases treated with permanganate of potash by a veterinary inspector.

A recovery of 83·3 per cent. for cattle and of 29·4 per cent. for buffaloes is said to have resulted from this treatment.

The administration of permanganate of potash as an internal antiseptic has been tested on several occasions in this laboratory in rinderpest, hæmorrhagic septicæmia, anthrax and other diseases, and all the results go to prove that the drug in no way exercises a beneficial effect. After the publication of the paper above referred to, further experiments were again made with the doses recommended by Walker. One to two ounces of vinegar was added to each dose. Treatment was commenced within six hours after the inoculation of

virus. Hill bulls were used, which are less susceptible than buffaloes. These animals weighed from 100 to 200 lb. The virus used was a forty-eight hours' broth culture grown at 37° C.

Doses of from ½ dr. to 3 dr. were used, but the results proved that permanganate of potash either in small, large, single or repeated doses has no beneficial effect whatever when administered to cattle suffering from hæmorrhagic septicæmia. In all cases treatment was commenced not later than six hours after the inoculation and in two cases a drench was given simultaneously with the inoculation. As the animals which survived showed no rise of temperature or other disturbance they were evidently immune.

Treatment of Hæmorrhagic Septicæmia with Iodine.

Out of a large number of drugs tested in the laboratory, iodine was the only one found to have any action on the course of the disease. When administered either by mouth or subcutaneously as late as sixteen hours after the inoculation of virus, about half the cases so treated recover. At sixteen hours after inoculation, susceptible animals generally show a rise of temperature, uneasiness and loss of appetite, and death follows in from twenty-four to thirty-six hours after the inoculation.

In laboratory experiments when an animal inoculated with hæmorrhagic septicæmia shows a decided rise of temperature or other symptoms of disturbance he rarely survives, unless he has received anti-serum treatment. In many of the cases treated with iodine the animals passed through a fairly severe attack of the disease and recovered. In other cases which ended fatally death was delayed by one to two days.

RESULT.

Out of three buffaloes treated with iodine subcutaneously sixteen hours after the inoculation of hæmorrhagic septicæmia, two recovered, one died.

Seven bulls were drenched with iodine sixteen hours after inoculation with hæmorrhagic septicæmia. Five survived, two died. Two of the bulls which recovered had high temperatures and were off feed for three days.

Two bulls were treated with iodine subcutaneously sixteen hours after inoculation. Both recovered.

Out of six buffaloes treated subcutaneously with iodine sixteen hours after inoculation, four recovered, two died.

Two buffaloes were treated with iodine injected intravenously. Both died.

Out of thirteen buffaloes treated with varying amounts of iodine, injected subcutaneously sixteen hours after the inoculation of hæmorrhagic septicæmia, six recovered, seven died. Out of the latter number death was retarded for three and four days in two cases.

Out of ten buffaloes drenched with varying amounts of iodine sixteen hours after inoculation with hæmorrhagic septicæmia, five lived and five died.

In order to ascertain the lethal dose of iodine administered in drench the following buffaloes were tested with large doses of iodine :—

Buffalo No. 1,340.—Drenched with iodine 4 dr. and potassium iodide 4 dr. in two quarts of water. Died several hours after the drench.

Buffalo No. 1,353.—Drenched with iodine 2 dr. and potassium iodide 2 dr. in a quart of water. Lived, no ill-effect.

Buffalo No. 1,354.—Drenched with iodine 2 dr. and potassium iodide 2 dr. in a quart of water. Lived, no ill-effect.

From the above result it was decided that about 2 dr. iodine and 2 dr. potassium iodide was the maximum therapeutic dose for the animals being tested—namely, buffaloes of one to two years of age weighing from 200 to 300 lb.

Out of four buffaloes treated with iodine subcutaneously sixteen hours before inoculation with hæmorrhagic septicæmia, one lived, three died in a short time after the inoculation.

THE OPHTHALMIC TEST FOR GLANDERS.*

During the past few years the ophthalmic mallein test has gained great favour in the diagnosis of glanders. The popularity of the test is rapidly gaining wherever this method has been applied, and among its supporters we find at the present time the best authorities on the subject of glanders and on clinical diagnosis.

The Bureau of Animal Industry, in consideration of the favourable results obtained from this test in other countries, has for a period of more than a year carried out extensive investigations with a concentrated mallein. For this purpose the co-operation of official and

* From the Reports of the United States Department of Agriculture, Bureau of Animal Industry. A. D. Melvin, Chief of Bureau.

practising veterinarians was solicited in various parts of the country. Ophthalmic mallein was furnished to all practitioners who desired to make a careful study of the method and establish its comparative value with other tests for glanders, especially the subcutaneous mallein test. In this experimental work about 18,000 horses have been subjected to the ophthalmic test, and in most cases it has been applied simultaneously with the subcutaneous mallein test. The data collected from the reports of a great number of veterinarians indicate satisfactory results from the eye test, and those who employed the method appear to be unanimous in their preference of the eye test over the subcutaneous test.

The comparative diagnostic tests for glanders which have been carried out by the Bureau of Animal Industry in connection with immunization experiments in glanders, and in several outbreaks of the disease, proved the eye test to be reliable and most practicable. In most of these instances the results were controlled by *post-mortem* examinations.

As a result of these favourable findings the Bureau has decided to recognize this method of diagnosis for the interstate shipment of equines.

This method has a great advantage over others by its very simple application. It may be readily executed by any veterinarian, and its other advantages are that the results are obtained in a comparatively short time and are, as a rule, distinct and definite. The simplicity of its application is plainly manifest when compared to the subcutaneous test, as it is only necessary to drop into one of the eyes of the animal to be tested 3 drops of concentrated mallein or, by a still simpler procedure, to dip a camel's-hair brush into mallein and introduce this into the conjunctival sac of the animal. The reaction usually commences in five to six hours after the introduction of the mallein, and lasts from twenty-four to thirty-six hours. A positive reaction is manifested by a purulent secretion from the tested eye. This may be very profuse or slight, sometimes associated with a severe conjunctivitis and œdema of the lids, and at other times without any inflammatory symptoms being present. At times only a very small quantity of pus may be present in the inner canthus of the eye. At other times the reaction may result in a true pyorrhœa. The reaction manifests itself in varying degrees in different animals, but the intensity of the reaction has no relation to the extent of the disease in the reacter.

The essential factor in obtaining satisfactory results from the test

appears to be in the use of the right kind of mallein. It must be by all means a concentrated mallein, and apparently the best results follow the use of raw or precipitated mallein, the former representing the mallein obtained after the concentration of the filtrate from the bouillon cultures of the glanders bacilli. The ordinary mallein used for subcutaneous testing is not adaptable, and the few failures which have been reported in the literature were due to the fact that the mallein employed was not sufficiently concentrated.

Instructions for applying the Ophthalmic Test.

Before the application of the ophthalmic test the animals should be carefully examined to ascertain whether the eye shows conjunctivitis or other changes which are associated with suppuration. Should such be present, the test should not be applied.

An average reaction to the ophthalmic test.

The test consists in introducing into the conjunctival sac of the eye several drops of either undiluted raw mallein or a solution of precipitated mallein (0·1 to 0·2 c.c. per horse). This may be introduced either with the aid of an eye dropper or preferably with a

camel's-hair brush by applying the brush gently along the inner surface of both the upper and lower eyelids. The other eye is not treated, but serves as a control for comparison of the reaction. For the testing of horses in the same stable the same dropper or camel's-hair brush may be used for all animals, but the dropper or brush should be sterilized before use upon different lots of horses.

As soon as the mallein is introduced into the eye practically all animals show a lachrymation, increased reddening of the conjunctiva, and slight photophobia. No significance should be given to these symptoms. They disappear in one or two hours. A pseudo-reaction can be produced by artificial or accidental irritation of the eye.

The characteristic manifestation of the reaction for glanders commences, as a rule, from five to six hours and lasts twenty-four to thirty-six hours, sometimes longer. It consists of a purulent discharge from the conjunctival sac which is typical and is frequently associated with reddening, swelling, and gluing of the eyelids. It is advisable to examine the tested animals in a good light from twelve to twenty-four hours, or preferably sixteen hours after the application of the test.

A suppurative discharge of varying quantities is considered a positive reaction. The conjunctiva and the eyeball should also be included in the examination after examining the discharge. By removing the purulent discharge (either by the stable attendant or by the animals licking each other, &c.) the positive result may be obliterated. In such cases dried pus may be frequently found on the parts around the eye, or the exposure of the conjunctiva by means of pressure by the thumb and finger will show fresh, purulent material.

Generally the positive ophthalmic reactions are not accompanied by fever or systemic disturbances. Occasionally, however, affected horses are hypersensitive to such a degree that even the few drops of mallein placed in the eye may enter the circulation and produce fever. Therefore, it is advisable, when possible, to accompany the ophthalmic reaction with temperature readings. For this purpose the temperature should be taken twice, the first time when the eye test is being made, and the second time when it is judged. In a doubtful eye reaction where there is an increased temperature of 1·5° F., the test should be considered positive if the animal had a normal temperature at the time the test was made.

In the absence of any secretion the test should be considered

negative. When there is a mucous secretion or lachrymation during the period of reaction the test must be considered as atypical, and in such cases it may be repeated the same day, when as a rule the results are more confirming.

The application of the ophthalmic test should not be repeated more than three times on the same animal within a short period, as experiments show that the reaction after the third application made within three months usually loses its intensity in positive cases and on subsequent tests may be entirely absent. In cases where the results of the second test immediately following the first test are atypical, the blood of such animals may be drawn and forwarded to a laboratory for the serum diagnosis, as the installation of ophthalmic mallein does not influence this method of diagnosis. From experience gained with the eye test such a procedure would become necessary only in comparatively few cases. In the control of glanders, animals may be retested every six months with satisfactory results.

The mallein for the eye test is a clear, syrupy, dark brown liquid, giving off a rancid disagreeable odour. This mallein is supplied in small phials of three sizes containing, respectively, 1 c.c., 2 c.c., and 3 c.c. of mallein. One cubic centimetre is sufficient for testing ten horses. Each bottle is dated, and the mallein is not recommended for use longer than three months after the date on the bottle. The Bureau will be in a position to fill orders promptly, therefore only sufficient amounts for immediate needs should be requested. Partly used bottles should not be kept over from one day to another. The portion of mallein unused at the end of a day should be discarded.

Instructions for Recording Test.

The results of the test should be recorded as follows:—

N = Negative. Eye unchanged.

S = Suspicious. Seromucous discharge.

P + = Positive. Seromucous discharge with purulent flakes.

P + + = Positive. Distinct purulent discharge.

P + + + = Positive. Purulent discharge with swelling of the eyelids.

P + + + + = Positive. Strong purulent discharge with swelling and gluing together of both lids.

Clinical Articles.

DEATH THROUGH SUFFOCATION OF A HORSE AFTER THE ROARING OPERATION.

By Staff Veterinary Surgeon Dr. LEONHARDT.

In October a five-year-old horse, which was a bad roarer, was brought to me for operation. The horse had only been brought to my surgery slowly, about 5 kilometres distance, and yet on his arrival he showed difficulty in breathing and made a noise for quite seven minutes. The owner was against tubing, and, having heard of the recent great success of the operation for roaring, he desired me to take the subject in hand.

The horse was cast and the operation conducted according to Eberlein's instructions. Five minutes after operating, and when the horse had got up and stood quietly, sudden suffocation was threatened by spasm-like closure of the glottis. The tracheotomy tube was, however, not used, as by keeping the operation wound opened for a minute the alarming symptoms subsided. As there was a possibility of a recurrence of the spasm at the height of the inflammatory phase, on the second or third day as I reckoned, I ordered an attendant to sleep in the stable at night and introduce a cannula which I left with him in case of need, and at the same time to send for veterinary help. I saw the patient three hours after the operation and gave him four lumps of sugar, which he took quite well. About two hours later I was telephoned to that the horse was suffocating. The horse had again been taken with spasm of the glottis, and the attendant, fancying he could not put in the cannula correctly, had sent for the veterinary surgeon. On my arrival the horse was already dead. The symptoms of suffocation had lasted for half an hour. *Post-mortem* examination showed that the cause of death was inflammation of the connective tissue of the pouches. The other parts of the larynx were normal.

I give publicity to this case because mishaps and bad luck teach as much as successes. Eberlein has noticed two cases of this kind in thirty horses he operated on.

In this case, if I had inserted the tube before leaving the mishap might not have occurred, but I reckoned that as the animal had been so quickly and completely relieved at first a repetition of the bad sequel would not have occurred so soon.

Now in all bad roarers after operating, if occasions warrant it, I shall insert for the first day or two one of Bartheliny's tubes as recommended by Eberlein.

I have had great success with the roaring operation and recommend it strongly when necessary. It can be learnt if the operation is conducted on a dead subject with Eberlein's instructive article at hand.—*Zeitschrift für Veterinärkunde.*

FUNGOUS GRANULATION IN THE BEND OF THE HOCK JOINT IN THE HORSE.

By Professor SCHWENDIMANN,
Berne.

Abnormal granulation and cicatrization in injuries of the bend of joints, especially of that of the hock joint, is not a rare occurrence.

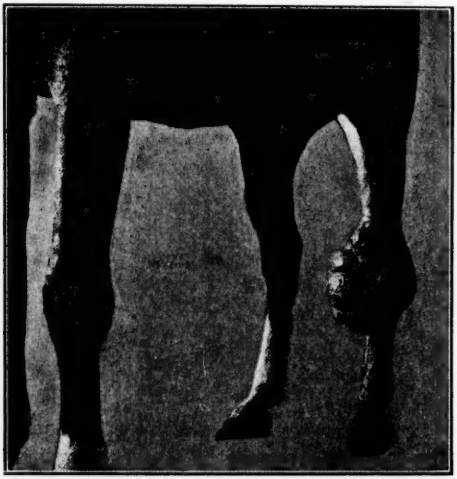


Fig. 1.—Showing the granulations.

A growth of such a kind in a horse brought to the clinic is noteworthy on account of its remarkable size. The four-year-old mare had got her left hind leg fast in some barbed wire and so occasioned injuries to the front of the hock joint. On examination the left hock joint in front had its whole surface above and below occupied and overhung by a large tumour-like growth of oval form. Its length

was 42 cm., the breadth 36 cm., and its thickness 13 cm. from its highest point. Its surface was ulcerated and covered with a greyish yellow false membrane.

The edges were sharply defined, the skin of the distal end of the shank moderately infiltrated. Consistence hard, slight inflammatory appearances, severe itching which caused the horse to bite the swelling. The general condition unaffected ; no lameness, but the foot, owing to limited movement of the hock, carried nearer to the ground in progression. Although the condition promised no favourable intervention the growth was removed under anæsthesia with the

FIG. 2.—The ulcerating wound after removal of the growth.

aid of a pressure bandage and tourniquet. Suturing the wound was impossible ; healing under a scab was aimed at, by exposing to air and a drying powder.

The growth removed weighed nearly 8 lb. and was a connective tissue formation with inflammatory cell infiltration and granulation tissue.

The occurrence of such growths is due to the presence of foreign bodies or dead portions of tissue where a great loss of

substance occurs and there is continued irritation of the wound. In this case there was irritation due to the extreme mobility of the injured region as a result of bending and stretching of the extremity and continued infection. After fourteen days' treatment the horse was sent home to the owner. At the end of January I had word that healing had taken place slowly and that the horse was very much inclined to gnaw the wound, but no new growths had occurred.—*Schweizer Archiv für Tierheilkunde.*

INVERSION AND AMPUTATION OF THE BLADDER IN THE HORSE.

By Staff Veterinary Surgeon NIPPERT.

A THIRTEEN-YEAR-OLD powerful East Prussian brood mare had foaled in the night without help, and had since suffered from prolapse of the vagina, according to the owner. On account of the increasing violent straining of the animal veterinary help was summoned after the condition had existed for forty-eight hours. On my examination I found a swelling between the lips of the vulva about as big as a child's head, pouch shaped, and dark reddish brown. The surface showed a mucous membrane appearance, with blackish red stripes here and there across it. On the upper somewhat flask-like diminished surface of the swelling two little folds were noticeable, from which voluntarily and on pressure a urinous fluid containing flakes of pus voided itself.

Diagnosis: Inversio vesical.—By washing with weak, lukewarm alum solution and massage of the swelling it was put back and secured by suturing, but at night the powerful straining of the animal caused the organ to be again everted. A fresh reposition was now out of the question, since the blackish red mucosa showed yellowish grey spots (necrosis), and the body temperature had risen to 39·2 C. I resolved on operative removal of the bladder. An elastic ligature was easily pushed over and above the openings of the ureters. I sutured the bladder about 1½ cm. behind this place with sterilized silk, and after three days the bladder was removed without special hæmorrhage, the stump remaining cicatrized on treatment with alum solution. After about six weeks the mare could be again used at light work.

If she could be no longer used for breeding, yet for over two years she has been employed at work. Maceration of the skin through continued trickling urine was avoided by daily cleansing and oiling of the parts concerned. On my visit last summer the voidance of trickling urine had decreased, and the dilated ureters appeared to have taken on a bladder-like function.

SOME CASES OF CHRONIC MYOSITIS IN THE FOAL.

By FLORIOT.

After dwelling on the history, etiology and treatment, and noting two forms (fibrous and ossifying) in which chronic myositis may arise, the author reports four cases, two of which he attended personally. There was chronic fibrous myositis of the semi-membranous fascia in three foals (eight, six, and four months old) and one horse, three years old.

In the four subjects the lesions were bilateral, and exhibited by a hard, painless, elongated tumefaction, diverging at one point and directed towards the fold of the buttocks.

In two foals (eight and six months) there was muscular retraction, causing a see-sawing movement and rendering the gait very difficult.

In the foal of four months and the horse of three years only a local tumefaction existed; the croup was not deformed, and the inconvenience of gait less marked.

Treatment consisting of vesicants, liniments and cauterization was quite useless, and the subjects were sold at a loss or sacrificed. In the author's opinion the affection develops soon after birth, and may have its origin in the manœuvres of accouchement.—*Revue Vétérinaire Militaire.*

AN INTERESTING CASE TREATED BY AUTOGENOUS VACCINE.

By R. F. STIRLING, M.R.C.V.S.
Lancaster.

Subject.—Half-bred shorthorn cow in milk.

History.—About the beginning or middle of February the cow was observed to be going lame on a fore-leg when returning from watering.

A nail was found to have pierced the horn just a little in front of one heel. The nail was withdrawn, and apparently had only just penetrated the sole. The usual "dab o' tar" was applied by the owner and the incident forgotten.

About three weeks later the cow was seen to be very lame and poulticing was adopted. This proving a failure I was called to attend on March 8, when the following were the symptoms :—

Symptoms.—Great swelling of the leg from the coronary band to the fetlock, with intense heat and a suspicion of moisture between hair and hoof. One heel was extremely swollen and painful, and a little in front of it on the solar surface was some exudate coming from a very small fissure in the horn. The fissure was opened up and the greater portion of the sole removed. Between the sole and sensitive structures was found the usual pus and debris. There was an opening in the sensitive sole corresponding with the fissure in the horny sole. I did not probe this opening, but contented myself with flooding in tincture of iodine and applying hot compress. I left instruction for continuance of compresses, and asked to be kept posted in the progress of the case.

It was a fortnight later when I was again called, and I found that suppurative openings had appeared at various points around the coronet—these were six in number, and were freely discharging, as was also the opening in the sensitive sole. On probing through any of these fistulous openings one could feel the roughened surface of the os pedis. The owner felt strongly inclined to slaughter the cow, especially as she was losing flesh rapidly and giving little milk. After some persuasion he consented to my trying the use of vaccine.

A sample of pus was collected and forwarded to Dr. Annett, of the Research Laboratory, Grafton Lodge, Runcorn, and four days later I was provided with six 1 c.c. phials of autogenous vaccine, each phial containing 3,000 million organisms, being 1,000 million of each of the three organisms isolated, viz., *Staphylococcus pyogenes aureus*, a micrococcus of the *M. catarrhalis* type, and a diphtheroid bacillus.

March 31, 1914.—First injection of ½ c.c. which was followed by a negative reaction.

April 1, 1914.—Second injection of 1 c.c.

April 4, 1914.—Swelling of the limb decreased, condition of the animal better—viz., feeding well and slight increase of milk. Third injection given.

April 7, 1914.—No pus visible from coronary fistulæ, a slight discharge of sanguineous fluid only. A caseous material has formed in the opening on the solar surface, which is removed, and the part dressed with 50 per cent. solution of chloral hydrate. Fourth injection.

April 10, 1914.—Coronary fistulæ healed. No further discharge has been seen from solar surface. Animal feeding well and milk supply almost normal. Fifth injection given.

April 13, 1914.—The opening in the sole has healed and all bandages have been removed since April 10.

Remarks.—Previous to this I have tried the ordinary stock vaccines in various similar cases in both horses and cattle with very doubtful results, and I cannot speak too highly of the result given in this case under the autogenous method, and that at a cost less than that of the usual stock vaccine. The result far exceeded my expectations ; the only "fly in the ointment" being that the owner of the animal cannot comprehend why I cannot treat every diseased condition, from a broken leg to tubercle, in the same manner !

AN INTERESTING BLADDER OF A PIG.

By P. MANUEL, M.R.C.V.S.
Crewe.

A short time ago I obtained from the slaughter-house, through the courtesy of the Medical Officer of Health, a specimen of the bladder of a pig which was absolutely full of dirty white sabulous matter.

The animal had given no indication of illness, and the carcase was in excellent condition.

I sent the specimen to Professor Lander, D.Sc., at the Royal Veterinary College, London, and he very kindly examined it, reporting as follows :—

The very interesing specimen from pig's bladder consists of triple phosphate — that is, magnesium ammonium phosphate— associated (naturally) with a little organic matter, but no uric acid. There is also a very small proportion of chalk.

A CALF MONSTROSITY.

By F. H. SANDERSON, M.R.C.V.S.
Darlington.

In April last I was called to a five-year-old Shorthorn cow, which had been in labour for several hours. I found four legs presented, and upon further examination discovered two heads. After working for an hour and a half without avail I decided to advise slaughter.

The calf remained alive for half an hour after being removed, and a *post-mortem* examination revealed only one set of internal organs, and one abdomen and thorax. There were two complete heads and necks, six legs (four fore-legs, two hind), and two tails, a most peculiar looking combination.

Canine Clinicals.

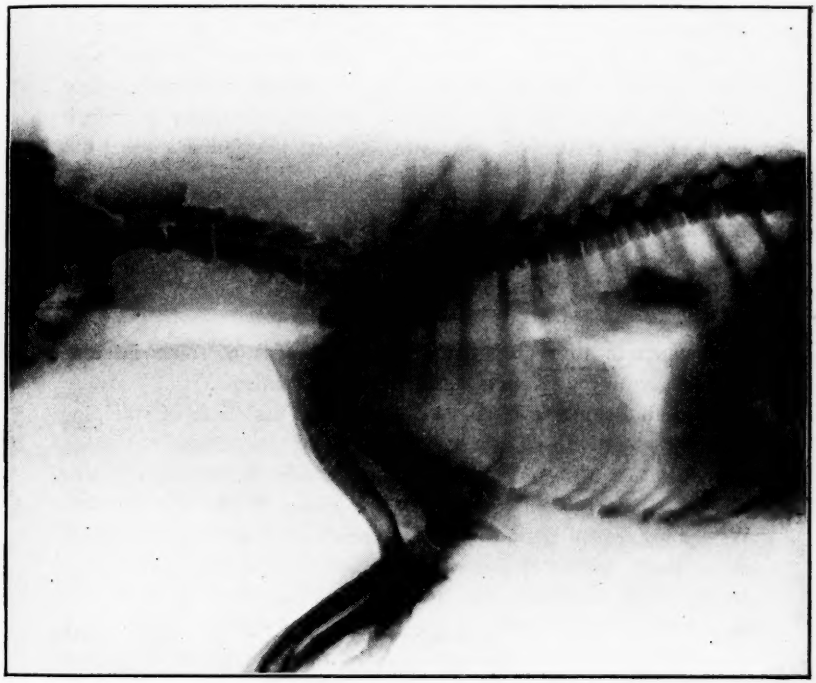
A CUTLET BONE DEMONSTRATED *IN SITU* BY SKIAGRAM.

By GUY SUTTON, F.R.C.V.S.
Kensington, W.

The folly of giving cutlet bones to dogs is well known, but it is not often that one is able to glean a complete history of events from the time of its ingestion until the death of the patient.

A young West Highland terrier, about 15 lb. in weight, was, in

its owner's absence, given the bone of a lamb cutlet. This was on a Saturday afternoon. It appeared perfectly well on the Sunday and Monday. On the Tuesday it vomited and after this act seemed uncomfortable at intervals but took milk. As it had had a good meal earlier in the day very little importance was attached to its disinclination to feed, and on visiting it in the evening there was nothing very striking. Beyond giving some bismuth as a powder, ice to lick, and advising that all food be withheld until the following



day, when I saw it again, the case excited no attention. On being called, the dog ran across the room and appeared to be perfectly bright. After a few minutes, however, it assumed a constrained attitude, stood perfectly still for a few seconds, and then took three or four steps backwards in a perfectly straight line. The clinical picture of the dog was suggestive. I made inquiries and learnt of Saturday's incident. We now offered a few shreds of raw meat

which were swallowed without difficulty. I gave some "tabloids" containing $\frac{1}{4}$ gr. of carbolic acid and requested permission to obtain a skiagraph. This was taken on the following day and demonstrated the presence of a large portion of the bone wedged in the œsophagus immediately over the heart. It could be felt with the probang, and for this purpose, so as to avoid doing damage, I used a piece of rubber tubing.

Telling the owner there was little chance of successful treatment, I did the only thing that promised success. By means of a rubber tube the dog's stomach was filled with thick "Benger's" food, and then $\frac{1}{50}$ gr. of apomorphine was injected hypodermically. The resulting vomit consisted of blood-stained "Benger's" food but no vestige of the bone. As the dog was obviously in pain it was humanely destroyed, successful surgical interference being out of the question.

AN INTERESTING PARTIAL HYSTERECTOMY.

By GEORGE ELMES, F.R.C.V.S.
St. Albans.

I VENTURE to record the following case as of some interest, particularly on the safety of pituitrin in small patients.

A small Pekingese bitch, $2\frac{1}{2}$ years old, at first time of whelping appeared slightly uneasy, but with no signs of effective labour pains, and 1 c.c. pituitrin was injected. This was followed by slight labour pains, and thirty minutes afterwards another 1 c.c. was injected. With assistance a dead puppy was delivered, and after an interval of an hour another 1 c.c. was injected, another apparently dead puppy being delivered with assistance. This pup appeared quite dead and was dropped into a toilet pail containing cold water, when after a few minutes he was seen to be moving. Artificial respiration and hot-water bottles revived him and he lived for five weeks. On the next day another pup could be felt through the abdominal wall. Three injections of 1 c.c. pituitrin were given at intervals of one hour, but as no signs of labour pains appeared as a sequel an operation was now decided upon. The bitch was given $\frac{1}{8}$ gr. of morphine followed in twenty minutes by chloroform. The left horn, as far as the junction with the body of the uterus, and the left ovary were removed, the puppy within being putrid. Recovery was uneventful except that the skin wound did not heal by first intention.

EXAMINATIONS IN CANADA AND THE UNITED STATES.

To those of our readers who intend to practise in Canada or the United States it is interesting to note that whatever diploma they may hold it is necessary to pass a further test examination. The undermentioned questions were recently set before an English graduate by the Saskatchewan Veterinary Association, it being his desire to settle down in practice as a veterinary surgeon in that province.

Questions set at the Examination of Graduates held at Regina, September 17, 1913:—

ANATOMY.

(1) Name the cranial nerves the functions of which are those of special sense.

(2) Name the openings in the diaphragm, and state what passes through each.

(3) (*a*) Name the muscles in the posterior tibial group.

(*b*) Give the origin and insertion of the flexor pedis perforans.

(4) Name the appendages and muscles of the eye.

(5) Describe what forms the circle of Willis. What body does it surround?

PHYSIOLOGY.

(1) Describe the processes involved in the secretion of urine. Illustrate by means of a diagram the particular vessels engaged in the specifications.

(2) Describe what you understand by reflex action.

(3) How is the blood purified? Where and what impurities are removed?

DISEASE AND TREATMENT.

(1) What are the distinguishing symptoms of gastritis, spasmodic colic and enteritis?

(2) How would you arrive at a correct diagnosis and location of the seat of hæmorrhage, whether from the kidneys, bladder or urethra?

(3) Give the causes and treatment of super-purgation, and name three diseases that may result from a severe case.

(4) Give the causes, symptoms and treatment of gastric tympany in the horse.

(5) Give the pathology of Johne's disease.

(*a*) How would you confirm your diagnosis?

(*b*) Why might Johne's disease be mistaken for tuberculosis?

SURGERY.

(1) (*a*) Describe Bier's hyperæmia treatment.

(*b*) Name five actions that may be obtained from this method of treatment.

(2) Give the causes, symptoms, prognosis, and treatment of sternal fistula.

(3) Describe the radical operation for poll evil, and state contra-indications to be considered in this operation.

(4) Describe the operation of paracentesis thoracis, and state where the vertical boundary for puncture lies in the horse, ox, swine and carnivora.

(5) How would you treat a case of purulent inflammation of the sub-coronary connective tissue?

CONTAGIOUS DISEASES.

(1) If an outbreak of anthrax occurred in your district, state how you would proceed.

(2) Give the differential symptoms of black leg (so-called symptomatic anthrax) and anthrax. What are the causes of each disease?

(3) How is mallein prepared? Describe the mallein test

(4) Describe variola vaccinia. What is the prophylactic value of this disease?

SANITARY SCIENCE.

(1) Describe a suitable and reliable system of ventilation for installation in a horse-barn.

(2) Mention in detail the regulations necessary for a city or town to enforce, in order to ensure that the milk supply is fit for human food.

(3) Describe the various grades of market milk.

MATERIA MEDICA.

(1) Name the appropriate antidotes for carbolic acid, opium, strychnine, Paris green and phosphorus.

(2) Name the sodium salts used in veterinary practice and give their action and uses.

(3) What is the composition of hydrogen peroxide? Give its action and uses.

(4) Give the action, use and dose of potassium iodide.

(5) If you were limited to six drugs for your medicine chest, what would you carry, and what diseases could you treat with each?

(6) What, if anything, is wrong with the following?

John Smith's stallion.

℞ Soda bicarb. ... ... ʒiii.
Acid. nit. mur. dil. ... ... ʒii.
Aqua, ad. ... ... ʒviii.
M. Sig., dr. i, t.d.s.

(7) What bacterins do we use most? On what theory does their usefulness depend?

(8) What local anæsthetic do you use? Why do you prefer it?

(9) How do aloes, arecoline and linseed oil differ in the way in which they produce their effect? Name conditions in which it would be better to use one instead of the others.

(10) What is physiological action of ergot?

COUNTY VETERINARY INSPECTORS.

Important Appointments.

At a meeting of the Executive Committee of the Aberdeen County Council held on the 22nd ult. a number of appointments of veterinary surgeons were made.

Mr. George J. S. Mower, M.R.C.V.S., was appointed veterinary inspector for the parishes of Auchindoir, Rhynie, and Clatt, in the room of the late Mr. Morrison.

Mr. William S. Lornie, M.R.C.V.S., was appointed for the parish of Turriff and part of Monquhitter.

Following upon his appointment under the Aberdeen Town Council, Mr. William Marshall, M.R.C.V.S., resigned his position as inspector for the parishes of Newhills and Oldmachar. He recommended for the position Mr. Robert E. Drennan, M.R.C.V.S., who was unanimously appointed.

Translation.

TUBERCULOSIS IN THE DUCK.

By A. CRETIEN.

Chief Laboratory Officer of the French Veterinary Research Service.

(Translated by I. S. C.).

Of late years tuberculosis in poultry has been notified at the Central Markets of Paris in an ever-increasing number of cases. This statistical increase may be due to greater exactitude or strictness in the methods of inspection, or instances of the malady may actually have become more numerous through consignments of birds from highly infected areas.

Among infected poultry fowls are always the most numerous and turkeys come next. Then follow guinea-fowls and pheasants in proportionately small numbers; but not a single case of tuberculosis in the goose or duck has been met with, although many *post-mortem* examinations have been made.

Similar statements have already been made by different writers, particularly in the "Proceedings of the Tuberculosis Congress of 1898." For instance, in a paper on "Tuberculous Contagion between Man and the Domestic Animals, and between the Animals themselves," Dr. Dubousquet-Laborderie says: "Among domestic animals the goat and the sheep, the goose and the duck, are those which offer most resistance to the bacillus; although some cases of contagion in goats and sheep have been recorded by Lydin, Koch, Tomassen, and König, I do not know of any account of spontaneous tuberculosis in the goose or duck. Straus, in his book, "La Tuberculose et son bacille," mentions an interesting fact, which shows how well these birds can assist the contagion of tuberculosis. The following details are communicated by Dr. Pomsay, of La Boissière, who had occasion to observe an epidemic of tuberculosis in a poultry farm of 600 fowls. Straus made sure that the disease in question was tuberculosis. With the fowls were mixed turkeys, ducks, and geese. Of 92 turkeys, 80 died of tuberculosis, but of 130 ducks and 62 geese drinking the same water, eating the same food, and roosting in the same fowl-house, not a duck or a goose fell ill."

On account of this usual immunity we think it interesting to note the following case of tuberculosis in a duck, for the account of which we are indebted to our colleague, M. Mestre.

The case is that of a mandarin duck, a female, aged 7, which had passed all its youth in an aviary with a drake of the same breed, and had never laid an egg. Adjoining the duck's enclosure there is another containing fowls and pigeons. The proprieter had never known of any illness in his poultry yard. The duck was found dead one morning without having shown any special signs of illness, though it was found to be extremely thin on *post-mortem* examination. On investigating the abdominal cavity the first thing to be noticed was the remarkable appearance of the spleen:

it was the size of a walnut and of a greyish colour, with here and there little granulated swellings of a greenish hue that suggested aspergilosis. Numerous tuberculiform lesions similar to those of avicular tuberculosis were found in the liver. The lungs and kidneys were slightly marked with whitish depressions. Several cervical ganglia were caseous, a purulent arthritis was present in the joint of the right humero-radial, and the marrow of the bones was invaded by numerous yellowish tubercles, the size of which varied from that of a pin's head to that of a pea. Apart from the rather special appearance of the spleen these lesions are those of avicular tuberculosis ; every lesion harboured large numbers of bacilli, which were capable of being tested by Ziehl's coloration method.

The histological examination proved that all the impaired organs, wherever situated, presented the same characteristics. The typical lesion at its full development was a follicular structure. Every follicle included two zones, a lymphoid periphery and a central caseous zone. The lymphoid zone was exclusively formed of cells mostly of the conjunctive type, that is to say, the nuclei were comparatively large and of a light colour, containing but little protoplasm ; certain of these cells, however, having more abundant protoplasm and a more highly coloured nucleus resembled very nearly the so-called epitheliod cells which occur in bovine tuberculosis. All these cellular elements were contained in a very thin fibrous non-vascular sac, somewhat similar to the outer tissue of lymphatic ganglia. Such a formation justifies the description of lymphoid as applied to this zone.

The central caseous zone was homogeneous, granulous, and filled with numerous eosinophiles when of a small size. When more extended the zone took on a stratified appearance, and seemed to be formed of concentric layers alternately granulous or homogeneous.

Bacilli existed in such quantities that on sections coloured by Ziehl's method they formed accumulations which could be seen by the naked eye. It is interesting to note their distribution in the lesions which have been described.

Right in the centre of the caseum there were no bacilli, only towards the periphery did they abound, and they were evenly disseminated. The bacilli were above all numerous in the cellular zone in contact with the caseum, and they had accumulated greatly in the protoplasm of the most interior lymphoid cells. These cells were so crowded with bacilli that their nuclei were often quite hidden. The tuberculous follicles were usually single, though sometimes they were united within a common lymphoid enclosure. Sometimes their central caseous zone had become confluent.

The commencement of a lesion was characterized by the appearance of a cellular spot on the surface of an organ where the parenchymatous elements became separated and finally disappeared, leaving in their place a more or less regular lymphoid islet, the epitheloidal central cells of which enclosed bacilli. In proportion to the spread of the lesion the bacilli increased at the centre, and caseation was produced. In this manner follicles developed and finally arrived at the mature stage which has been described above.

The following experimental inoculations were conducted :—

Two guinea-pigs, inoculated in the peritoneum with ½ c.c. of an emulsion of the spleen lesions, rapidly grew thin in general while their abdomens swelled. When they were slaughtered, at the end of six weeks, in each abdominal cavity there was found a purulent mass the size of a walnut encysted in the middle of the intestinal loops. Several mesenteric ganglions were caseous. The liver and the spleen contained a certain number of translucent tubercles. In these various lesions there were a good many bacilli.

In two guinea-pigs which were inoculated under the skin there was a small local lesion, which disappeared rapidly. It was the same with two guinea-pigs which received a subcutaneous injection of the pus from the guinea-pigs which were inoculated in the peritoneum.

In these latter the lesions showed the ordinary follicular type. The liver and the spleen were filled with microscopic non-caseous follicles, which at several infrequent points became confluent, and constituted grey tubercles that were visible macroscopically.

Cultures made on glycerinated potato produced, after a certain time on the stove, greyish-white, thick and shining colonies similar to those of avicular tuberculosis.

To sum up, because of the macroscopic and microscopic aspects of the lesions, their situations and their wealth of bacilli, combined with the aspect of the cultures and the lack of virulence in the bacilli when transferred to the guinea-pigs, the similarity to avicular tuberculosis may be affirmed. It may reasonably be considered probable that this duck, having less powers of resistance than our indigenous breeds, was infected with tuberculosis by the neighbouring fowls, which must have had the disease, though the owner did not suspect it.

ROYAL COLLEGE OF VETERINARY SURGEONS.

Fellowship Degree.

A meeting of the Board of Examiners for the Fellowship Degree was held at the College, 10, Red Lion Square, W.C., on Saturday, May 16, 1914. The following is a list of the successful candidates, together with the titles of their respective theses :—

Bagenal Harvey Mellon, "An Account of some Aspects of Disease as it affects the Brain of the Horse."

John Holroyd, "Embryotomy."

Reviews.

The Chemistry of Cattle Feeding and Dairying. By J. Alan Murray. Pp. xii + 343. Longmans, 1914.

This volume will probably admirably fulfil its primary object, which is that of instructing the agricultural student. It is less likely to succeed in utility to the farmer or veterinary practitioner.

The fundamental, chemical and physical basis of effective feeding control are satisfactorily dealt with, and the chapters on milk, its composition, variations and products, are very clear. The general get-up and illustrations are good.

It is the hope of scientific men that a really rational quantitative guide to feeding may be realized, but one must admit that at present much remains to be done.

The prevalent tendency is to treat all classes of food constituents—fat, protein, carbohydrate and fibre—as of equal digestive and nutrient value, and to reduce these components by means of factors to a starch value, which serves as a good basis at least for the calculation of the cash value; but, especially in regard to protein foods, it must be remembered that the value of rations of proteins of different origin and of the same "chemical" value is different, and may be widely different in practice. We are pleased to see recognition of this in the author's pages where reference is made to the lack of nutritive value of zein of maize, recently studied by Hopkins.

An analytical certificate lumps together all sorts of fat, protein, &c., contained in a given food. Every practical man must have seen such certificates of "food value" attached to an article which a self-respecting cow would not eat, or which is a poison.

Without wishing to appear reactionary, one may say that practical experience is at present, at any rate, the best guide. The man who believes in using the best foods, whose purity and wholesomeness are guaranteed by long experience, is likely to spend a little more, but is sure to lose less in the long run, than the man who believes that a good food, showing an excellent analysis, can be made, advertised and marketed at a price from 20 to 25 per cent. less than the cost of good standard foods.

These remarks are not intended in any sense as a reflection on the present book. One would, however, have liked to see more in it by way of warning as to the possible sophistications and likely dangers of compound foods and of concentrated foods. Whilst it is a certain truth that all vegetable substances can show a good quantitative analysis, it is not true that qualitatively they are equal.

G. D. L.

Cysticercus ovis, the Cause of Tapeworm Cysts in Mutton.
By R. H. Ransom, Chief Zoological Division, Bureau of Animal Industry, Department of Agriculture, Washington.

The author in his pamphlet calls attention to the importance of a systematic examination of carcases of sheep for cysticerci. The belief that sheep measles is rare has been lately discovered to be quite erroneous in America. During the year 1912, 20,000 sheep carcases were retained for inspection on account of measles at various abattoirs in the Federation. A life history of the *Cysticercus ovis* is given, and its methods of diagnosis described. Its significance in meat inspection is indicated, and though the parasite is not transmissible to man, it not being identical either in action or form with *C. cellulosæ*, yet from æsthetic reasons meat containing tapeworm cysts is entirely objectionable.

The important measures against infestation of sheep with *C. ovis* are accentuated. The carcases of dead sheep on the farm or range should be destroyed by fire, so that they may not be devoured by dogs or wolves, and dogs must be kept free from tapeworms by systematic medicinal treatment (male shield fern capsules and areca nut, and the dog's head kept tied up high, so that he does not throw up the medicine).

The publication concludes with three pages of illustrations of the cysticerci in various stages. Here we note the great value of scientific research, for it is pretty conclusively proved in the pages of this pamphlet that the *C. ovis* is not the same parasite as *C. cellulosæ*, nor yet is it to be confused with *C. tenuicollis*. In the light of these investigations the German regulations, placing sheep measles in the same category as pork measles, would seem to be unnecessarily stringent.

Meat inspectors should obtain this pamphlet from the Department of Agriculture, Washington, D.C. It appears to be a reprint from the *Journal of Agricultural Research*. G. M.

Spirochæta suis: its Significance as a Pathogenic Organism.
By Walter E. King and George L. Hoffmann.

Any facts relating to the question of the causation of swine fever are at the present time of great interest to veterinarians in all countries in which the disease exists. The history of the bacteriological investigations in this complaint, as, indeed, in the case of all others the causation of which has been ascribed to an invisible virus, is of more than passing interest. From the time of the researches of Salmon and Smith, published in 1885, until 1904, the cause of hog cholera was believed to be the *Bacillus choleræ suis* (*B. suipestifer*). In the latter year de Schweinitz and Dorset showed the typical hog cholera in the United States to be due to a filtrable virus, and this has been confirmed by Hutyra, Uhlenhuth, and others in Europe. King and Hoffmann, as a result of careful researches carried out by them at Detroit, have come to the conclusion that a large spirochæte and numerous

granules previously demonstrated in the blood of pigs suffering from swine fever play an important part in the etiology of the disease. They have, moreover, succeeded in cultivating this organism artificially for several generations and in transmitting the disease to healthy animals by the injection of such cultures.

The work of these authors appears to have been carried out under exceptionally favourable conditions as regards the supply of material, &c., and their findings are worthy of serious consideration by all those who are in contact with outbreaks of disease in this and other countries. Their paper is extremely interesting and instructive, and one cannot help but be impressed by the thoroughness with which the experiments have been carried out. It is quite evident that the authors at no time lost sight of the fact that an invisible virus might be carried through the various cultures, and their efforts to exclude the possibility of infection in experimental animals arising from such a source were marked and apparently attended with successful results.

To preclude the possibility of infection arising from the stables in which these experimental animals were kept normal pigs were allowed to inhabit them and so act as controls. Again, animals which had contracted the experimental disease in a mild form showed marked resistance when brought into contact with hog-cholera pigs.

It is to be hoped that this aspect of the etiology of swine fever will receive serious consideration in this country. The results which have attended legislative measures have not been so successful as to warrant researches such as these being entirely ignored. J. B. B.

The Rhodesia Agricultural Journal, February, 1914. Edited by the Director of Agriculture, assisted by the Staff of the Agricultural Department. Published bi-monthly. Printed by the Argus P. and P. Co., Ltd., Salisbury, Rhodesia. Price 5s. per annum.

This journal contains much of interest and value to Rhodesian farmers. It is well printed, and the articles in it are varied and well written. The matter of water supply in the province is being State regulated, and for the proper development of agriculture and the best use of the land there is no doubt this is of supreme importance. A bacon factory is to be established at Salisbury, but on modest lines for a commencement, for it is proposed to deal with only fifty pigs per week. Perhaps this is wise if factory operations can be conducted economically, but at present modern factories are dealing with 750 pigs per week. A regular supply of suitable pigs is, however, essential to the success of any bacon factory. Mr. R. C. Simmons has an article on "The Breeding and Feeding of Pigs for Bacon Factory Purposes," and for the most part the article is instructive and reliable. It will be difficult, however, or well-nigh impossible, to produce the best bacon pig on a preponderance of maize feeding, and we are pleased to see that Mr. Simmons advises the use of grain food

and skim milk with it. Maize is cheap and plentiful in Rhodesia, and there will be a tendency to use it too freely as a ration. We are inclined to think that the gestation period in the sow is wrongly stated at 112 days (although we know this is the time given for the sow in breeding tables). We think the true average is nearer 115 days. We are rather surprised to find carrots omitted as a food for bacon pigs (perhaps none are grown in Rhodesia). We do not agree that mangolds, beet, turnips and swedes "are all best cooked." We do not advocate turnips at all as a food for pigs, and mangolds and beet are best given in small quantities, raw and pulped. We have seen many sudden deaths in swine fed on cooked mangolds. The reason for giving them raw is that by cooking the tastiness of the roots declines; but, more important still, the albuminous substance in them becomes less soluble by the digestive juices, and the ferments that aid digestion and exist naturally in the roots are destroyed by boiling. As a safe proposition we think, too, that any roots used in swine feeding should not exceed one-fourth part by weight of the ration. A well-illustrated and well-written article by Rupert W. Jack, F.E.S., is that on the diseases of potatoes and the selection of sound seed. Other subjects touched on are "The Cabbage Web Worm" and "The Production of Pedigree Seed." There is an interesting report of a veterinary conference, at which a resolution was passed advocating the establishment of a serum station in England to immunize stock against red-water and gall sickness previous to exportation and to test animals with tuberculin and mallein. Lectures are being given to farmers and departmental bulletins issued. G. M.

Some Phenomena involved in the Life History of Spirochæta Suis. By Walter E. King and Raymond H. Drake. *Journal of Infectious Diseases*, vol. xiv, No. 2, March, 1914, pp. 246-250.

The authors make a further contribution to the study of the life cycle of *Spirochæta suis*, the organism which is claimed by them to be intimately connected with the causation of swine fever. A further contribution is promised, which, it is stated, will aid in the elucidation of the problem of the life cycle of spirochætes in general. Meanwhile the present article deals entirely with some interesting facts concerning some successful attempts which have been made to obtain cultures of *S. suis* from Berkefeld filtrates of infective material. The authors state that "this work was undertaken chiefly for the purpose of securing data bearing on three important points: (1) To determine the correlation between the filtrable virus or ultra-microscopic organism of hog cholera and *S. suis*; (2) to secure pure cultures of the spirochæte; and (3) to determine the importance of the granules assumed to be related to *S. suis*." As is rightly pointed out at the end of the communication no definite conclusions should be drawn from this short series of experiments, but the results appear to furnish one more link in the chain of evidence which tends to show that *S. suis* may play an important part in the etiology of swine fever. J. B. B.

Union of South Africa Department of Agriculture Report, with Appendices for the period January 1, 1912, to March 31, 1913. Printed by the *Cape Times*, Ltd., Government Printers, Cape Town. Price 9s. 6d.

This Government Blue Book contains the report of the Secretary for Agriculture and those of the varied officials who act in their special capacities for the Department of Agriculture. The report of the Veterinary Division is issued by Mr. C. E. Gray, M.R.C.V.S., and is an interesting record of work done in the Union. Mr. Gray does not consider that South African cattle are unsusceptible to tuberculosis, although with the animals living under far more natural conditions than in this country disease is not common. Nevertheless it exists, and as civilization advances it is likely to spread. Measures are being taken against it, but owing to the lack of interest evinced by stock-owners, and failure to report the disease, repressive work is only carried out inadequately.

Mr. A. W. Shilston, M.R.C.V.S., has performed some valuable research investigations at the laboratories at Pietermaritzburg, and Mr. Wm. Robertson, M.R.C.V.S., has done good work in connection with the Pretoria laboratories in the immunizing of cattle against East Coast fever.

Altogether the Report shows evidence of real life in all the departments of agricultural activity, and perhaps the most interesting and valuable information is given under the heads of co-operation, cotton and tobacco, dairying, farm labour, entomology and live stock. The volume would take many days to review adequately, but it can be heartily recommended to all those who intend to take up residence in South Africa and to get their living out of the land and on the land. G. M.

The Agricultural Journal of the Union of South Africa, December, 1913. Edited by William Macdonald, M.S., Agr. Sc.D. Issued by the Agricultural Department. Printed at the Government Printing Office, Pretoria. Annual subscription outside the Union, 6s. post free. Issued free of charge to residents within the four provinces forming the Union of South Africa.

This is the last issue of the Journal under the editorship of Mr. Macdonald, a man who has conducted the periodical with energy and success for an uninterrupted period of ten years and ten months. In the editorial notes which preface this issue attention is called to a useful and valuable innovation about to be accomplished next year. This will consist of the first complete collection of statistics relating to farming within the Union of South Africa, and thereafter the work will be undertaken annually. Mr. Paul A. van der Byl, M.A., contributes an illustrated article on "The Nature of Fungi, with reference to the Life Histories of Some Important Parasites." The smut and rust of wheat are intelligently discussed in this paper, and their origin is lucidly traced to their admixture with healthy seed at

harvest time, and the part the wind plays in the spread of the spores is mentioned. The question of "Tobacco Warehouse Management" is dealt with in a well-illustrated piece of writing by T. E. Elgin, of Pretoria. The importance of "Soil Investigation" in a country opening up to agriculture is emphasized by Dr. C. F. Juritz, M.A., F.I.C., and the futility of trying to grow produce on unsuitable ground may to some extent be avoided if proper investigation is carried out. The article on "Lucerne" is very welcome, and Mr. H. A. Melle gives a splendid account of it. This paper might be read with advantage by many English farmers, as for an all-round fodder plant for horses, cattle, sheep and pigs, lucerne is hard to beat, but it is a plant that needs wooing in a particular way in order to produce the best results, and Mr. Melle tells how this can be effectively done. Mr. Moore, B.A., of Potchefstroom, contributes a useful paper on "The Wheat Louse," and the Journal closes with some varied and brisk arguments on "The Veld-burning Question" in the shape of controversial letters from readers, followed by "A Report of Fruit Storage Experiments" and "Rural Notes," &c.

The periodical must be doing excellent work in the Union, and we are confident that no intelligent South African farmer will be without it. We wish it long years of success, and we can easily see that the field in which it works is limitless and inexhaustible.

G. M.

The Cornell Veterinarian, January, 1914. Published half-yearly under the auspices of the Alumni Association and Society of Comparative Medicine, New York State Veterinary College, Cornell University, Ithaca, N.Y. Price 50 cents per year.

This is a very interesting periodical. It contains a notice of the opening of the new buildings in connection with the New York State Veterinary College, from which it would appear that interest in veterinary science is keen and funds plentiful. A four years' course is in prospect at this college for the veterinary diploma. Mr. W. B. Switzer, V.S., of Oswego, contributes a well-considered article on "Some Requirements of the Successful Practitioner." To those starting in practice the hints he gives are very valuable, and those who "have arrived" may peruse his homily with profit. His remarks with regard to the "Tom, Dick, and Harry" practitioners in America are quite applicable to the same charlatans here. He opines that one of the first questions calling for answer from those in active practice will be: "Can you cure this patient so it will be all right or serviceable, and how much will it cost?" We have known several good practitioners and successful business men who would answer this question rather differently from the way Mr. Switzer advises. A set rule can hardly be given as to how to reply to it. A keen knowledge of human nature is frequently necessary to answer the query astutely, and a wide knowledge of results to answer it at all profitably. We have known many good clients who never dreamt of asking such a question, and we have known some good men who,

when asked, have replied according as the client was religious or worldly : that " the issues of life and death are in Higher Hands than theirs," or that " veterinarians are but indifferent prophets."

W. L. Williams, of Ithaca, puts before the profession the importance of guarding the milk supply from infection through diseases of the internal generative organs in cattle.

W. E. Muldoon gives a timely and comprehensive essay on " Surgical Anæsthesia."

Mr. R. R. Bolton describes how he relieved " Upward Luxation of the Patella " by anæsthesia with chloroform and repeated flexion and extension of the limb after reduction of the luxation.

The journal closes with alumni and college news, and there are two paragraphs of humorous poetry, bearing on our calling, on its last page. Altogether the publication is very readable, instructive, and progressive. G. M.

Proceedings of the American Veterinary Medical Association, New York City, September 1 to 5, 1913. Published by Wm. J. Dorman, Philadelphia, U.S.A. Edited by John R. Mohler.

The Fiftieth Annual Meeting of the American Veterinary Medical Association was held in New York City from September 1 to 5, 1913, and the volume of details of the proceedings occupy some 1,084 pages, every paragraph of which contains something of interest.

The American Veterinary Medical Association holds a similar place in America and Canada to the National Veterinary Association of Great Britain, and it would be a very excellent idea for both countries if delegates could annually be sent from the one to the other. The advantage would be mutual, for the American Association would reap the experience of the older country and we on our side would see and understand the enormous field of work in the countries of the Newer World. The absurdity of any narrow-minded policies is at once seen by all who travel, but in no country of the world is it so easily demonstrated as in America.

An English reviewer, in glancing through these *Proceedings*, cannot but at once be struck with the vastness of the work undertaken, the thorough earnestness with which it is carried out, and the enormous field in front. " So much to do, so much undone," the words of Cecil Rhodes, were never more truly applicable than to a subject like this, the advances made by veterinary science in America. To belong to the American Veterinary Association carries with it a status and an honour only permitted to those whose educational attainments have been assured by the college from which they have graduated.

In this work of 1,084 pages, excellently bound and finished off, there are papers on all subjects, a few of the titles of which will explain themselves. In those engaged in pathology we find : " The Production of Artificial Immunity against Tuberculosis," by Gilliland and Marshall ; " Immunization Tests with Glanders Vaccine," by Mohler and Eichhorn ; " Police Measures and Hog Cholera," by

Kersley; "The Value of Abortion as a Diagnostic Agent," by Meyer and Hardenberg; "Cerebrospinal Meningitis," by Kaupp.

For the surgeon no less than three papers are written on Abdominal Surgery, including one by Professor Merrillat. Herniæ, Oophorectomy, Certain Surgical Operations on the Dog, and many other subjects find a place; and for the clinician, in addition to the above, we have such everyday subjects as Hock-joint Lameness, Anæsthesia, Firing, Methods of Clinical Diagnosis of Lameness originating below the fetlock, Artificial Insemination, Veterinary Science from the Country Practitioner's Standpoint, Various Lamenesses, and many other subjects too numerous to mention.

The practical demonstrations of surgical and other things likely to be of interest and benefit to the everyday practitioner are features of inestimable value at all these meetings, and from this point in particular the English National Veterinary Association might take a useful hint.

The List of Members of the Association is a very lengthy and influential one, comprising as it does all the best and most eminent veterinarians in the United States and Canada—truly a proud testimonial to the value of the life-long services of the Honorary President, Dr. Liautard, the distinguished Frenchman, who may truly be said to have been the founder and pioneer of veterinary science in America. F. H.

German Breeds of Live Stock. (Presented by H. Hauptner, Berlin, N.W. through his English Representatives, A. Favre and Co., 122, Newgate Street, London, E.C.) Issued by the German Agricultural Society; published by the German Agricultural Society, Berlin.

This, one of the official publications of the German Agricultural Society, has been translated into English, and some presentation copies have been sent over here. It is a well-printed, informative book, and contains good accounts of the typical horses, cattle, sheep, and pigs of Germany. There are 106 splendid illustrations of pedigree horses, cattle, sheep, and pigs in the illustrated supplement to the letterpress of the volume. The horses mentioned are the East Prussian, Hanoverian, Oldenburg, East Friesland, Holstein, Schleswig and Rhenish, and in each breed the district the horses inhabit is shortly described, the breeding methods are given, the measures to promote and improve the breed are stated, and the type, appearance, action, use and prices are made plain to the reader. Similar descriptive methods are applied to the cattle, sheep, and pigs. Shorthorns appear to be the only English cattle that are met with in quantity in any part of Germany, and these are chiefly confined to a district in Schleswig-Holstein. Shropshire Down, Hampshire Down, and Oxford Down sheep may be found scattered about in various places, and large white and Berkshire pigs have found homes in many parts of the Fatherland. What strikes a Britisher most in reading the book is the strong support and assistance that the State gives to promote and encourage the breeding industry, and

the scientific way in which valuable statistics are collected and put together.

To the man who wants to gain knowledge of German live stock and methods of managing them, the book can be recommended whole-heartedly. Special praise must be given to H. Hauptner, of Berlin, for putting such a valuable work within reach of English readers. G. M.

Correspondence.

HUMANE SLAUGHTERING—A BIG STEP FORWARD.

To the Editor of THE VETERINARY JOURNAL.

DEAR SIR,—It does not seem to be fully realized to what extent the adoption of humane methods is now in the hands of the public, nor how the public may exert its influence. During the last year petitions have multiplied, local authorities have asked the central authority for increased powers to enable them to prevent cruelty in slaughtering, and the Local Government Board, in response to these applications, has allowed the following sentences to figure in amended local by-laws :—

"Throughout these by-laws . . . . the expression humane killer means an instrument, other than a pole-axe or club, which can be operated mechanically, and which is suitable and sufficient to produce the immediate and effectual stunning of the animals upon which it is used."

"An occupier of a slaughter-house, &c. . . . . shall not proceed to slaughter any animal until the same shall have been effectually stunned by a humane killer."

The enforcement of by-laws which include these clauses will carry into effect the main object in view—viz., that all animals should be humanely stunned before being slaughtered. Brighton, Cheltenham, Chiswick, Croydon, Hornsey, Plymouth, Romiley (Cheshire), and Southampton are among the localities whose councils are actually engaged in remodelling their by-laws in a sense that would be met by the new clauses. There are other places too numerous to mention here where either public petitions asking for similar reforms are being worked up or the authorities have gone forward on their own initiative.

As every slaughter-house is subject to the control of a municipal corporation, a borough council, an urban district council, or a rural district council, there is now some definite prospect that humane methods of slaughter will be enforced throughout the whole country. This reform, however, very largely depends upon the public. Where there is complete indifference, it can hardly be supposed that the local authorities will show any zeal ; but wherever there is a genuine desire that methods which cause needless suffering and

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terror should be replaced by methods which prevent both these evils, the feeling of the district may be expected to find expression through its local councillors.

Further information and advice can be obtained from the Council of Justice to Animals, 21A, Savile Row, Burlington Gardens, W., or from the Royal Society for the Prevention of Cruelty to Animals, 105, Jermyn Street, W.

Yours faithfully,

Stroud, May 27, 1914. R. O. P. P.

PARLIAMENTARY.

Contagious Diseases of Man and Domestic Animals.

Mr. C. Bathurst asked the Chancellor of the Exchequer whether, in connection with the proposed Government subsidy for the institution of pathological laboratories, he would consider the need of research work in connection with contagious diseases, such as anthrax, tuberculosis, glanders, cow-pox, and foot-and-mouth disease, which were common to human beings and domestic animals, and apply a portion of the proposed grant towards the conduct of such research and the greater co-operation of the medical and veterinary professions in the interests of human health.—Mr. Lloyd George said the grants proposed were in respect of laboratories to be used primarily for purposes of expert diagnosis and not of research, but he understood that certain of the subjects mentioned were engaging the attention of the Medical Research Committee.

NOTE.—All communications should be addressed to 8, Henrietta Street, Covent Garden, London, W.C. Telephone, 4646 Gerrard. Telegrams, "Baillière, London."

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